

Research Journal of Pharmaceutical, Biological and Chemical Sciences

An Interesting Case of Intestinal Obstruction Due To Nonrotation of Midgut and Internal Hernia.

Girinath Venkat J*, Joseph Alexander , and Jayapriya J.

Department of Radiodiagnosis, SreeBalaji Medical College and Hospital, 7 Works Road, Chrompet, Chennai-600044, Tamil Nadu, India.

ABSTRACT

A case of malrotation of midgut loop with right para duodenal hernia in an adult male who presented with recurrent abdominal pain, vomiting and features suggestive of intestinal obstruction .Intestinal rotation is a well-known cause of obstruction in neonates and children and may present as midgut volvulus. This condition is uncommon in adults and may present as vague intermittent abdominal pain or sometimes acutely as upper GI obstruction. CT abdomen showed abnormally positioned duodenojejunal flexure on the right side of abdomen suggesting mal- rotation. Clustered and dilated small bowel loops with narrow mesenteric pedicle and features of closed loop obstruction were seen in the right para duodenal region suggesting internal hernia. The diagnosis of malrotation with or without associated complications like internal hernia or volvulus should always be kept in mind when evaluating adult patients with symptoms of vomiting and pain.

Keywords: Midgut , Malrotation,Paraduodenal hernia, whirlpool sign, Ladd's procedure.

**Corresponding author*

INTRODUCTION

Intestinal malrotation is defined as any deviation from the normal 270° counter clockwise rotation of the midgut during embryologic development, also known as nonrotation [1]. Midgutmalrotation is a congenital anomaly referring to either lack of or incomplete rotation of the fetal intestines around the axis of the superior mesenteric artery during fetal development. Most patients usually present with bilious vomiting in the first month of life because of duodenal obstruction or a volvulus. It is rare for this condition to present in adulthood. It has been estimated that it affects approximately 1 in 500 live births [1]. It is a rare presentation in adults. It has been reported that the incidence of malrotation in adults is approximately between 0.00001% and 0.19% [4,5]. The patients generally present with cramping generalized abdominal pain and vomiting. Most cases of nonrotation in adults are detected at emergency laparotomy for intestinal obstruction due to midgut or ileocecal volvulus or for other conditions. In adults, the diagnosis in the pre-operative period is extremely difficult owing to a very low index of suspicion

Case Report

A 19 years old male came with history of not passing stools for the past 3 days associated with abdominal distension, abdominal discomfort, non bilious vomiting 2 episodes not blood stained. Clinical examination per abdomen revealed impaired resonance, diffuse lower abdominal tenderness without guarding or rigidity. Bowel sounds present, hernial orifices were free.

Imaging Findings

X-ray abdomen showed distended small bowel loops. Ultrasonography of abdomen also revealed dilated small bowel loops. Visible peristalsis was present. No free Fluid in the peritoneal cavity. Plain CT Abdomen followed by Oral and IV contrast showed a cluster of proximal small bowel loops encapsulated in the right mid-abdomen which showed an abrupt point of transition at the level of L3 vertebra ; mesenteric vessels were seen converging towards the point of transition and clustered at the medial aspect of the encapsulated sac; the mesenteric fat within the sac showed stranding and the bowel loops within were dilated , Duodenojejunal flexure was not clearly seen, superior mesenteric vein seen ventral to superior mesenteric artery. With these findings Internal hernia of small bowel was made out. Barium meal follow through was also done to rule out mal-rotation of the gut. 15-30 minutes film showed normal fundus, body and antrum of stomach. 1hr and 30 minutes film showed normal duodenal cap, DJ flexure was seen on the right side of abdomen, suggesting Non-Rotation seen.

Most of the proximal jejunal loops was seen over the right side of the abdomen. In 3-6 hrs film – Satisfying emptying of the stomach and small intestines was noted. Large intestine and caecum was seen in normal position. Explorative Laparotomy was done. Intra operative findings were consistent with imaging findings. The contents of the sac was reduced excess sac excised and the defect was closed in layers to prevent recurrence. DJ flexure was brought to the left side and fixed.

Barium Follow Through Images

Figure 1: 15-30 minutes – Normal study of fundus, body and antrum of the stomach

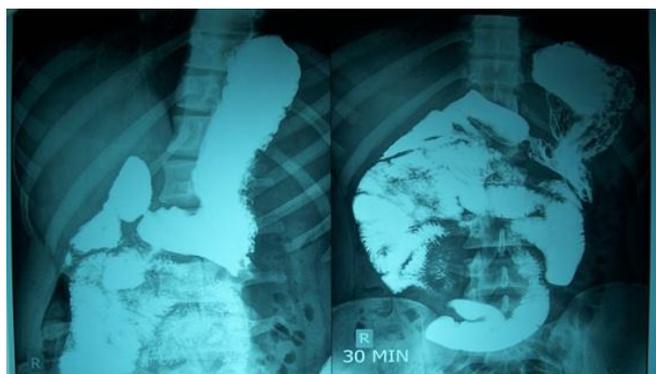


Figure 2: 1hr an 30 minutes – Duodenal cap normal, DJ flexure seen on the right side of abdomen suggesting non-rotation. Most of proximal Jejunum loops seen on right side of the abdomen.

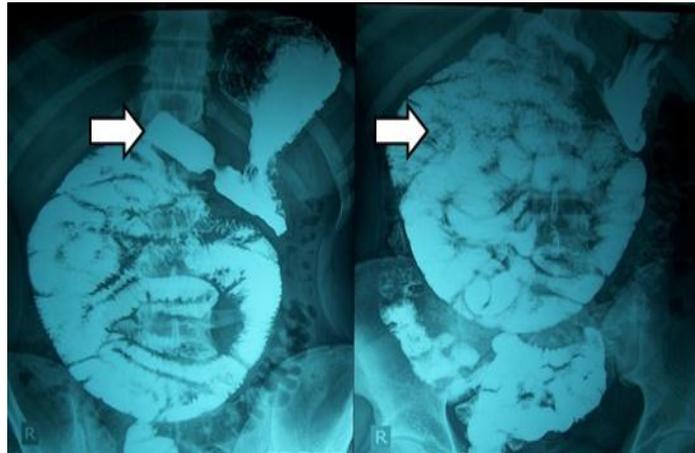


Figure 3 :3-6 hrs film showed satisfying emptying of the stomach and small intestines. Large intestine and caecum in normal position



CT Images

Figure 4: CT WHIRL OR WHIRLPOOL SIGN; The swirling appearance of bowel and mesentery twisted around the superior mesenteric artery axis.



Figure 5: CT image showing a cluster of proximal small bowel loops is seen encapsulated in the right mid-abdomen which show an abrupt point of transition at the level of L3 vertebra ;



Mesenteric vessels are seen converging towards the point of transition and are seen clustered at the medial aspect of the encapsulated sac; the mesenteric fat within the sac shows stranding and the bowel loops within are dilated

DJ flexure not clearly seen, Superior mesenteric vein seen ventral to superior mesenteric artery

DISCUSSION

Rotational Abnormalities

During gestation the midgut grows so rapidly that the intraembryonic coelom is too small to accommodate it. So the midgut with its superior mesenteric artery is pushed into the extra-embryonic coelom in the umbilical cord, forming a temporary physiological umbilical hernia. When the midgut returns back to the intraembryonic coelom, rotation of the midgut loop takes place through 270° in anticlockwise direction in three stages.

The arrest of development at any stage changes anatomical placement of organs and also narrows the mesenteric base and impairs fixation. Intestinal malrotation is defined as any deviation from the normal 270° counterclockwise rotation of the midgut during embryologic development, also known as nonrotation [1,2]. Arrest of the first phase leaves the bowel herniated into the umbilical cord, creating Omphalocele. Arrest during the second phase may result in Nonrotation, incomplete rotation, hyper-rotation, reversed rotation. Gastroschisis and diaphragmatic hernias and mesocolicparaduodenal hernias can also occur during the late second phase of rotation.

Failure of the third phase results in mobile caecum, unattached duodenum, or unattached small bowel mesentery, makes bowel vulnerable to caecal volvulus and internal hernias [3].

Most common clinical presentation of malrotation is cramping generalized abdominal pain and vomiting. Most cases of nonrotation in adults are detected at emergency laparotomy for intestinal obstruction due to midgut or ileocecal volvulus or for other conditions. In adults, the diagnosis in the pre-operative period is extremely difficult owing to a very low index of suspicion [6]. The diagnosis may be made by upper GI contrast studies. The duodenum may be distended and may have an abnormal shape. The duodenojejunal flexure is usually displaced inferiorly and to the the right and the caecum may be on the left. The 'corkscrew' pattern of the duodenum and jejunum spiralling around the mesenteric vessels is pathognomonic for midgut volvulus on the upper GI study ,the calibre of the bowel decreasing distal to the point of partial obstruction.

The small intestines may be entirely in the right side of the abdomen. Barium enema may show a displaced caecum with ileum entering the caecum from the right. Ultrasound shows the superior mesenteric vein located on the left of the superior mesenteric artery suggest nonrotation of the intestine though not sufficiently accurate. Computed tomography shows a whirl or whirlpool sign [7-9]. The swirling appearance of bowel and mesentery twisted around the superior mesenteric artery axis.

Differential Diagnosis

- Normal duodenum: located inferiorly because of gastric distension or abnormally because of feeding tube, renal agenesis, splenomegaly, etc.
- Duodenum inversum
- Wandering duodenum

Complications

- Midgut volvulus- the small intestine has an unusually narrow base, and therefore the midgut is prone to volvulus (a twisting that can obstruct the mesenteric blood vessels and cause intestinal ischemia).
- Internal hernias

Management

Ladd procedure : Intervention for this condition comes in the form of a surgical Ladd's procedure[10]. This procedure consists of 4 parts: counter clockwise detorsion of the midgut volvulus if present.

Division of Ladd's bands overlying the duodenum thereby relieving the cause of the intermittent obstruction; Widening of the narrowed root of the small bowel mesentery by mobilizing the duodenum; and division of the adhesions around the SMA to prevent further volvulus.

The small bowel is positioned primarily to the right side of the patient's midline and positions the large intestine on the left and fixed.

The bowel will remain in this backwards position for the rest of the patient's life. The appendix is removed to avoid diagnostic errors in later life.

Closing of mesocolic defect if any to prevent future internal hernias.

CONCLUSION

Adult presentation of intestinal malrotation is a rare condition and difficult to diagnose. These patients often present with chronic abdominal pain and vomiting with or without signs of intestinal obstruction or strangulation. Diagnosis requires a high index of suspicion. Midgut volvulus can occur at any age, so the diagnosis of malrotation and volvulus should always be kept in mind when evaluating adult

REFERENCES

- [1] Torres AM, Ziegler MM. World J Surg 1993;17:326–331.
- [2] Emanuwa OF, Ayantunde AA, Davies TW. World J Emerg Surg 2011;6:22.
- [3] Brandt ML. Intestinal Malrotation. In: Intestinal Malrotation 2006. Available via DIALOG.
- [4] Von Flue M, Herzog U, Ackermann C, Tondelli P, Harder F. Diseases of the Colon and Rectum. 1994;37:192–198.
- [5] Wang C, Welch C. Surg 1963;54:839–855.
- [6] Shailendra Singh, Anupam Das, A.S. Chawla, S.V. Arya, and Jasneet Chaggar. Int J Surg Case Rep 2013; 4(1): 72–75.
- [7] P Saxena. The Internet J Surg 2009;26(1).



- [8] Bastiaan W. Haak, Sander T. Bodewitz, Caroline F. Kuijper, and Louise M. de Widt-Levert. *Int J Surg Case Rep* 2014; 5(5): 259–261.
- (a) Strouse PJ. *Pediatr Radiol* 2004;34:837–851.
- [9] Ladd WE. *N Engl J Med* 1936;215:705–708.
- [10] Neal E Seymour, MD and Dana K Andersen. 2005; 9(3): 298–301.